Measure: Voluntary Travel Carbon Offset Program (T5)

Implement a city-specific carbon offset program that will increase investment capital available for carbon-reduction. The measure's goal is for 1% of citizen-based GHG emissions (about 45% of Tucson's total) to be offset in 2012, followed by 2% in 2013 and growing 1% of GHGs each year to 10% by 2021.

Relative to community engagement, implementation includes, but is not limited to, having a web-based site that enables community members to offset their carbon expenditures and kiosk in travel intensive hubs such as Tucson International Airport. Relative to delivering credible offsets, implementation includes engaging third-party organizations to generate the offsets.[1]

The potential percentage of the City's goal shown below is in italics to emphasize that the totals are not being counted in the total of the analyzed measures for GHG reductions because offsets are a financing mechanism, and counting offsets could therefore result in double counting.

Finally, we recognize that reaching the below abatement potential might be a 'stretch goal'. According to TEP's Annual Report, participation in their GreenWatts program is approximately 1.5% of their customer base. [2 & 3] Using this as a proxy for possible participation in an offset program, involvement could grow from from 1.5% to 10% over the course of the decade. If 10% of Tucson citizens participated in 2020, they would only need to offset less than ~5 tCO_2e to meet the below goals.

Emission reduction potential:	297,397 tCO_2e in 2020
Percentage of goal (2012):	*1.6%*
Percentage of goal (2020):	*13.1%*
Total annual average implementation costs:	$330,000
Entity that bears the costs of implementation:	City of Tucson or charitable donations
Cost/Savings per tCO_2e:	NA
Net annual savings:	NA
Entity that realizes the financial return:	NA
Equitability (progressive/regressive, income/revenue neutral, etc):	Positive: Offset projects can be designed to support marginalized communities
Potential unintended consequences:	Higher admin costs; loss of effectiveness due to poor offset investment choices; offsets have lower local economic multiplier than alternatives for the donated funds.

Background information:

There might not be a more discussed topic in climate change mitigation than the topic of offsetting. The science, quantification, economics, and morality of offsetting all need to be handled carefully and soundly.

Basically, an offset allows a person or entity to pay for a carbon reduction, which is universally measured in metric tonnes of CO_2 equivalents (tCO_2e – the primary measurement unit of this report).

There are two primary global markets for offsets: regulatory and voluntary. This report is concerned with the voluntary aspect of offsetting and only in a regional context for reasons discussed below.

The purchased reduction is intended to "offset" the emission of an equivalent ton of the purchaser. For an offset to be credible, it has to adhere to five distinct criteria. The offset has to be real, additional, verifiable, permanent, and enforceable.[4] These criteria include the concept that "but for" the offset money, the investment that reduces GHGs could not have been made.

The President of the Pew Center on Global Climate Change states simply and informatively that[5]:

> "*Offsets are crucial to achieving emissions reductions targets"*

When the offset is purchased, the offset retailer is under contract to implement a project meeting the above criteria. Options for offset projects range from reforestation to fuel switching to renewable energy generation to methane destruction to bike sharing.

Description of Measure and Implementation Scenario:

The City of Tucson implements a voluntary carbon offsetting mechanism that allows individuals to pay for local, real, additional, verifiable, permanent, and enforceable GHG mitigation projects affecting the City's emissions inventory.

It is assumed that the program is setup and administered through a third-party, which results in minimal costs to the City.

As the University of Arizona (UA) is on track to commence similar mitigation projects via the student-approved "green fee", it is advisable to coordinate any such efforts with UA to maximize abatement potential.

A significant portion of Tucson resident offsetting is likely to come from voluntary offsets of airline travel or ground-based out-of-Tucson, which is not currently a part of the City of Tucson's GHG inventory tracked by the Pima Association of Governments (PAG).

Therefore, this analysis concludes that offsets will not count towards the emissions reduction goals of the City of Tucson.

However, if the offsets are managed such that the funds are critical to emissions reduction projects going forward, the fund is likely to become a very important tool in support of emissions reductions.

The PAG emissions model does not account for land use changes; therefore, the City should not consider forestry projects with offset revenues if the sole intent is to reduce quantified emissions.

Important marketing of the program will occur at places associated with GHG emissions decisions, including TIA and private airports, fueling sites, sporting events, etc.

For example, if departing travelers at TIA are assumed to be 50% of the ~3.7 million passengers in 2009,[6] if only 2% of departures (92,500) chose to offset their roundtrip's approximately 2 tCO_2e (the average roundtrip distance per flight is assumed to be 2,068 miles[7] with associated emissions of 0.827 tCO_2e[8]), the offsets would total over 70,000 tCO_2e, which is more than 2% of citizens' estimated share in 2012.

Has the Measure been implemented elsewhere and with what results?:

Many US cities are leveraging offset funding to compliment their GHG mitigation. For example, San Francisco CA, Austin TX, and Denver CO are either implementing or working on programs analogous to the one envisioned for Tucson in this analysis.

According to the Department of the Environment, San Francisco's SF Carbon Fund[9]:

> *"…invests monies from activities that produce climate damaging greenhouse gas pollution (such as air travel) into local projects that reduce greenhouse gas pollution and support local economic development. All of the projects in the Fund take place within San Francisco's boundaries."*

In **San Francisco's** "Climate Passport" program, the cost per ton of CO_2e in San Francisco is $13.50 of which $1.50 is funneled back into the City's "Carbon Fund". The program is administered by an offset aggregator and retailer, 3Degrees[10]. Airport funds totaling $190K paid for the setup of the program[11]. Also, 3Degrees manages the kiosks[12]. A $12.00 portion of the revenue is used to purchase offsets form the Garcia River Forest Project. The other $1.50 is used by the City to establish offset-generating contracts with third-party project developers. Therefore, the only costs to the City are those to manage the contract with 3Degrees and the local project developers. We will assume this to be 0.5 FTE employee in the econ analysis.

Under the "Go Neutral" part of the **City of Austin's** Climate Protection Program, the City intends to "*Provide tools and resources for citizens, businesses, organizations, and*

visitors to measure and reduce their carbon footprint.[13]" Their vision is that the program will include offsetting, but as of their 2010 annual report, implementation is forthcoming[14].

Denver's program, outlined in their Climate Action Plan, has been put on hold. [15 & 16]

Energy/Emission analysis:

We analyze this measure assuming that 1% of citizen-based emissions will be offset in 2012, an additional 1% each year (2% in 2013, 3% in 2014, etc.) to 10% of citizen-based emissions by 2021.

Citizen-based emissions are estimated at 45% of the PAG inventory total (27% is emitted by residential housing, to which we add one-half of transportation emissions that are 37%, reaching ~45%).

The yearly goals are the following in tCO_2e:

2012:	31,500	2017:	194,738
2013:	63,378	2018:	228,558
2014:	95,637	2019:	262,776
2015:	128,282	2020:	297,397
2016:	161,314	2021:	332,424

Total through 2021: 1,796,005

We assume that the offsets purchased through the measure are entirely used to finance GHG reduction projects in the City's inventory that would not otherwise happen. Since financial analysis of what would or would not happen without these funds has not been done, we are not including the reductions attributable to these offsets in the Climate Change Committee's plan to meet its 2020 goals.

Most all of the other GHG reduction measures have overall savings for the investors rather than costs per tCO_2e saved – so to count this measure along with the reductions sought through other measures would be potential double-counting.

Therefore, the chart below shows each tCO_2e offset resulting in an actual tCO_2e reduction, but the offsets are not included in the report's analysis of the cumulative effect of the various measures.

Climate Change Impact Summary in tCO_2e:

Contribution analysis:		
COT 1990 Citywide GHG emissions (baseline)[17]:	5,461,020	tCO_2e
MCPA 7% reduction target for COT:	5,078,749	
2012 BAU GHG emissions projection:	7,000,000	
2020 BAU GHG emissions projection:	7,343,141	
GHG emissions reduction to meet 7% goal (2012):	1,921,251	
GHG emissions reduction to meet 7% goal (2020):	2,264,392	
Voluntary Travel Carbon Offset Program		
Contribution of T5 Voluntary Travel Carbon Offset Program (in 2020):	*297,397*	tCO_2e
2020 Contribution of T5 Voluntary Travel Carbon Offset Program:	13.1	%

Economic analysis:

Measure Costs

We assume each ~30,000 tCO_2e offset requires 0.6 FTE to administer the program, and that each FTE costs $100,000.

Administrative costs in 2012 are $60,000; in 2020 $600,000. Total administrative costs are $1.65 million over ten years, averaging $330,000/yr. In other words, the costs are about $2 per tCO_2e offset.

For comparison, the economic involvement of the City government appears to have been very low in the case of San Francisco. Airport funds were used to initiate the project, and their contractors (3Degrees et al) manage the kiosks and handle the carbon offset generation. Its cost is estimated at $13.50 / tCO_2e.

Measure Savings

We are not counting the offset investments as actual savings to avoid double counting.

However, the potential exists for the offset program to facilitate 1.8 million tCO_2e reductions in Tucson through 2021.

Net Economic Impact

This is not calculated since the net economic impact will primarily depend on the local multiplier of the offset expenditures on GHG reductions and program administration compared with the local multiplier of the expenditures of the offset money for other purposes.

Since most GHG reduction measures create long-term savings for the investors, the offset program could have a very positive economic impact if it is used to facilitate those investments in residential PV systems, etc.

Co-benefits:

Co-benefits include reduced pollution, spurring local business via mitigation projects, projects can be used to further local adaptation planning and/or to help reduce the urban heat island effect.

Equitability:

Offset mitigation projects can the geared towards assisting marginalized communities with the capital investments associated with energy conservation and energy efficiency.

Potential unintended consequences:

Negative unintended consequences include the following, though the risks are low of their occurrence:

- The offsets not meeting the above-mentioned five criteria for legitimacy, and the program loses credibility with the public and becomes a poor investment of administrative expenses. It is especially important that the offsets are invested in projects that would not have otherwise occurred.

- Administration costs are much higher than predicted, causing a reduction in the effectiveness of the offsets program at actually reducing Tucson emissions.

- The spending of the offset funds has a lower local economic impact multiplier than where the donor would have spent the funds otherwise.

Endnotes:

References Note: All references retrieved October through December of 2010 unless otherwise noted.

[1] Conflict of Interest disclosure: Co-author of this analysis David Schaller is a co-founder of an existing local carbon-offset program, The Local Trust, which is a program of the Global Sports Alliance.

[2] http://www.tep.com/Green/Greenwatts/Docs/ACCAnnual2009.pdf

[3] http://www.faqs.org/sec-filings/100226/TUCSON-ELECTRIC-POWER-CO_10-K/#105

[4] World Resources Institute's *Outside the Cap: Opportunities and Limitations of Greenhouse Gas Offsets*. Available: http://pdf.wri.org/outside_the_cap.pdf

[5] Congressional Testimony of Eileen Claussen - *How to Design Legislation to Contain Cost and Minimize GHG Allowance Price Volatility*. Available: http://www.pewclimate.org/federal/congress/testimony/claussene/how-to-design-legislation

[6] http://www.flytucsonairport.com/includes/media/docs/CAFR_2009_final1.pdf

[7] http://www.bts.gov/publications/transportation_statistics_annual_report /2004/html/appendix_b/html/table_05_04.html

[8] Calculated at: http://www.nativeenergy.com/pages/travel_calculator/465.php

[9] http://www.sfenvironment.org/our_programs/topics.html?ssi=6&ti=85

[10] http://www.sfenvironment.org/downloads/library/sfe_sfo_climate_passport_faq.pdf

[11] http://calairportscouncil.org/articles/(SFO)_11_1_09_Carbon.pdf

[12] http://www.flysfo.com/web/page/about/news/pressrel/2009/sf0963.html

[13] http://www.ci.austin.tx.us/acpp/downloads/acpplan_overview.pdf

[14] http://www.ci.austin.tx.us/acpp/downloads/acpp_annual_2010.pdf

[15] http://www.greenprintdenver.org/docs/Greenprint_Council_Report_Rec3.pdf

[16] http://www.usatoday.com/travel/flights/2008-06-29-airport-checkin_N.htm

[17] PAG Regional Greenhouse Gas Inventory- 2010